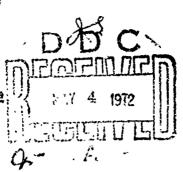
NE046-810

Pinal Report to ONR on Near- (C) 00015-65, 1 nov. 1967

Spectra of Southern Galaxies with Carnegie Image Tube

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During February 1967 a cascaded image tube on loan to me from the Carnegia Institution of Washington was installed in the Fast Spectrograph at the Newtonian focus of the Cardoba filinch reflector at Bosque Alegie, Argentina. It was used to observe galaxies from 26 Feb. to 4 Mar. and showed a large gain in speed over the f/0.5 semi-solid Schmidt used earlier with Eastman 103aF film in the spectrograph. Twenty-four spectra were obtained of 20 galaxies and 6 stars.

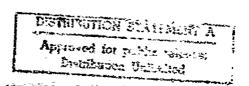
The image tube developed by Drs. Merie Tuve and W. Kent Ford, Jr. ef DAM, Carnegie Institution requires 20,000 volts provided by a Varian-Mikros high-voltage supply powered by 110 volts AC. A 110-volt power supply (and new telescope centrols) had been provided by the Smithsonian Astrophysical Observatory, and installed at Dosque Alegre in Aug. 1966. The Smithsonian also purchased an f/0.87 Super-Farron of 3.6-inch aperture to focus the spectrum on the photo-cathode of the RCA C33011 tube. This, the tube and an Elgert f/1.2 transfer lens were mounted by Dr. Ford in a 6.5-inch cylinder (Fig. I) centaining alnico har magnete that produce a uniform magnetic field of about 225 Gauss along the axis of the tube. It was estimated that external magnetic fields of 100 milli-Gauss would displace the focussed spectrum by about 10 microns.

The 90-mm aperture of the Super Farron lens is less than the 97 x 63 mm. beam from the plane grating in the Fast Spectrograph, causing a 0.85 reduction in speed. The equivalent focal length of the Super Farron lens is 75 mm (larger than that of the semi-solid Schmidt camera) resulting in a dispersion of 290 A/mm. (instead of 480 A/mm.) and a further 0.4 reduction in speed. Moreover, the transmission of the 7-component, glass Super-Farron lens is 80% for wavelengths greater than \$500 A and drops to zero at \$900 A. Nevertheless, the image intensification of the RCA C 33011 focussed on Eastman 103a0 or IIaO plates results in a gain of 10 or more for wavelengths from \$500 A to 7500 A.

Photographic focus tests were made for the Edgest lens ifecussing the phospher screen on the plate), the high voltage (19000 velts) focussing the ECA tube, and the spectrograph collimator focussing the spectrum on the photo cathode. Fig. 2 is a 2.5 x enlargement of plate IT-27 with such focus tests on the Noon spectrum showing that the best settings are: Eigest 0.90, voltage 19000, collimater 25.7. A rough magnetic survey of the region near the dams opening (where the image tube would be during expenues) showed that the horizontal component of the magnetic field changed by 100 m 6 from har side of the opening to the other, but spectra takes with the tube in these two positions showed no discornible shift.

The following spectra of galaxies were obtained; several with strong mosalight superimposed. Pigs. 3 and 4 are 2.5 x enlargements, each with he communison spectrum. (Starting from the left (yellow), the 5577 A night-sky line is seen, then 5552 A Been, closely packed he lines to 5717 A and wider specel ones to 7550 A. Then the second-order blue-green spectrum, anding on the right with the strong 5852 A Been line.)

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Table 1.

Image-tube Spectra of Southern Galaxies, Cordoba, Aug. 1967

-				• •		
xcc	Mag	Type	Flate	Comparis BS Ro.	Type	Reserves
3783 *	13.1	SPa.	48 58	5288 4922	KO III	En. line. Star underexp.
4373#A	12.3	E390	55	5089	GS III	
4767,A	12.9	E580	60	5136	ко	Ster under
4945*	9.5	SBe	71	6855	w III	En
5064	13.1	So	58	4922	F2	Ster under
5128	7.7	Ep	48			Under exp.
5139		Glob Clust	62	(6563	Plan Heb)	
5365,8	12.8	5360	51 52	5580 5580	F8 F8	Star over exp.
5643	12.4	SBc	60	5698	Fő	Re., Star under
59 67	12.8	Se	52 58	5530 4922	F8 F2	Star over Star under
6221	11.8	SBb	66			Fm. lines
6758	12.8	ET	19 55 71	7674 5089 6855	F8 G8 III H1 III	Both under exp
6368-70	12.3	E2Se	72	7943	Fl 4	
5984-2	13.3	8BcS	53 61	6635 8368	½0 IA K5	
7064	12.9	São	63	7943	F1 V	Star under
7124	12.8	SBe	56	7674	78	Both underexp.
7205	11.7	So	50			Fogged
7232	13.2	SBa	61	8368	ed ia	Star overexp.
7410	11.8	20	44			

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NGC	Mag	Type	Plates	Comp. Star	Туре	Remarks
7412	12.0	SBb	56	8700	C3 IV	Star under
7421	12.8	SBa	59	6635	K2	
7496	12.1	SBb	73	8787	re in	
Ic						
3896	13.0	E18Be	72	7943	F1 V	
4662	12.0	Irr	71	6855	w III	Em lines
5150		Plan Meb	57			
5240	12.5	SBa	53	8611	FO	
5328	12.8	E5	73	8787	F6 IV	

^{*} Repeats of 3 spectra obtained in Mar. 1967.

The 2 x 2-inch plates usually have & spectra on each.

"BS Mo." refers to Yale Bright Star Catalog.

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